The RAND Corporation

AHK

1-3-58
M-41

L. J. Henderson

To: R. J. Lew

From: A. H. Katz

Subject: RECONNAISSANCE SATELLITE AND COMMENTS ON YOUR WM-2553

Copies To: E. J. Barlow, R. L. Belzer, R. W. Buchheim, F. R. Collbohm, M. E. Davies, J. W. Ellis, R. H. Frick, R. T. Gabler, T. B. Garber, C. Gazley, W. B. Graham, E. C. Heffern, J. H. Huntzicker, H. A. Lieske, D. J. Masson, A. S. Mengel, File

We will take the opportunity furnished by your WM-2553 to attempt to answer the questions raised, requests for information, etc., and (hopefully) to give you more information than you really asked for.

First off, we want you to know that we really appreciate your follow through efforts in the Pentagon arena.

As far as getting more copies of RM-2012, we believe this is a straightforward matter. I guess all you have to do is ask for them. To fully highlight and place in perspective what has been going on, we have compiled a partial chronology of events which should be helpful.

Actually, Mert started looking at spin-stabilized panoramic cameras for satellite application in late spring; we had received information from Fairchild early in 1957 on their panoramic cameras, etc. In fact, we talked to Oder and the 117L people about this kind of thing during the summer. In order to appreciate and understand Oder's essentially bleak and dim reaction, one must realize that at the time he radiated this reaction there were still large and open questions about the funding of 117L, the program had been continually deferred: satellites, space, and related topics were not Okay words (this was really pre-Sputnik), much defense of 117L was needed, etc.

So, from their viewpoint he just did not actually need a new satellite; he was trying desperately to hold onto the old satellite. When he suggested, in order to divert the head of steam which we had started to crank up was that we try to make our satellite compatible with the Lockheed configuration. Of course at this time we were still thinking of an Atlas-boosted vehicle and were therefore thinking of our recce satellite as a backup vehicle to the Lockheed bird.

There is, for example, a memo from Davies to Katz, dated 9-10-57, entitled 'Progress of Recoverable Satellite Study,' and just for kicks a copy of this is appended. At this time we were getting static not only from Oder, but also from RAND. Putting it mildly, we were unable to obtain at that time the services of those people who subsequently turned out to be co-authors of RM-2012, namely R. W. Buchheim, R. T. Gabler, T. B. Garber, C. Gazley, E. C. Heffern, J. H. Huntzicker, H. A. Lieske, D. J. Masson, and M. E. Davies. The event that finally put the show on the road was the threat to the 117L program, not by the Russians, but by the other services. We got a good snoot-full of this from Buchheim and Clement, who fortunately have several heads. It was really the imminence of the DOD meeting finally held at RAND on 14 and 15 November 1957 that finally shook the necessary man hours loose.

We met with the Steering Committee of this Division somewhere in early November and started a big piece of work. As you can verify from Clement, it proved exceedingly difficult to get the word to BMD - that indeed there was going to be an interesting meeting at RAND on 14 and 15 November, and that they were scheduled to participate. There were so many parallel channels operative trying to get the word to them that we are not now sure just how we finally did it. On 8 November, we had Commander Truax and Major Conway from the 117L office over here and gave them a quick run-down on our ideas. On 13 November-- the day just before the DOD meeting - we gave an improved and polished run-down to Colonel Oder, and at the same time supplied him with briefing aids, a written speech of Jack Vogel's, which was a summary of all the work, and offered to be present in the audience on 15 November when he was to deliver the speech. We choose now to make an interim re-cap.

First, we persuaded BMD via Buchheim and Clement that their program was indeed in danger, and that we understood the sister services were likely going to have some interesting presentations to make. Next, we told them that they could escape this threat by presenting this hot new RAND idea, and gave them all the material necessary to make the presentation.

The logical consequences were then very much like the incidents reckoned with in Faust, or if you prefer a less classic illustration, the story of The Devil and Daniel Webster. In case you are familiar with neither of these, I can say it this way: we first persuaded BMD of the jeopardy (?) in which 117L lay and that if they would swallow a RAND pill - sugar coated with briefing aids, back up reports, and a readily written speech, then on the one hand the threat to their program was removed, but on the other hand, having committed themselves to the RAND proposal, they would certainly have to act on it.

We did not then regard this as a literary device or a countermove in any DOD game.

Well, then the Stewart Committee met over here on 14 and 15 November, the presentation was made, and was apparently well received. Now, let's pause another second and go back to an independent series of events.

On 29 and 30 October 1957, Duncan Macdonald's Reconnaissance and Intelligence Panel of the SAB met at BMD in order to hear the 117L pitch. Present from Duncan's group were Duncan, Phil Strong, from the three-letter agency, and Dick Raymond; also Ernie Plesset, walked in on this (!). I understand that Ernie is the liaison type from another panel to Macdonald's panel. At this two-day meeting, the first day was spent by Oder and crew telling the SAB and certain other visitors from Headquarters and ARDC (including Davies and Greenfield and Katz) why the 117L was really the finest project in the Air Force. The second day, October 30, Dick Raymond started talking. He very carefully enumerated and identified his several heads and started out talking as a citizen and SAB type, pointing out the urgency for development of reconnaissance, basic intelligence problems, etc. He then put on his GE head and talked about a recoverable satellite which they were working on. This sounds very much like our (and his) previous recoverable satellite study (?), and (aborted) recommendation of early 1956. However, this configuration used the Thor

booster, some sawed off solid rockets, and wound up with a small satellite on orbit. The camera that was going to be in this bird was very much like the camera in the 117L bird - a vertical strip camera. The focal length was going to be 12-inches and film width 12 inches. The film to be used was going to be microfile and resolution used in this version was also going to be 100 lines per millimeter. Inasmuch as we always have been and continue to be very friendly with Dick Raymond, we took occasion to let him know that we were working on the notion of recoverability, but did not say much more, and Dick stated that he really didn't care who did it - he just thought it ought to be done.

Well, as you know, General Electric started running with the ball. They got to Headquarters and ARDC and here were told by various reconnaissance types that the GE camera was just not very good, and that they should kindly hie themselves up to General Goddard and Harry Gewertz at Bulova. They did this and got, as a result, the HYAC camera developed by Boston University. I could say much more about this, but I don't think I will.

Now, back to the main story. On 16 November we sent out our recoverable satellite recommendation to Headquarters USAF. MAG visited here the following week, November 20-22. During the early part of their visit, we had an independent visitor from CIA, one Mr. Merkel who works for Phil Strong. By this time, they (CIA) had already been thoroughly briefed on the General Electric proposal and were also very anxious to hear about ours. We had already given advance copies of the RM to BMD and we suggested that Merkel ought to be able to obtain one from Oder (who in fact shipped him over here to begin with). As it turned out, Oder did not choose to give him a copy. Apparently the CIA is going to have some kind of a voice in decisions about these things or at least so Merkel indicated.

The afternoon of the 20th, I briefed MAG on this whole problem area, including 461L and related matters, but spent most of the time on this new hot satellite. On the 26 and 27 November, Stan Greenfield, who was touring the backwoods of Baltimore and Washington with Al Wilson on satellite matters, got roped in by John Patton into briefing General Walsh of AFCIN and his group. On the 27th, Stan briefed Colonel Stewart and a large group at AFCIN-1. In the meantime, the GE proposal was apparently making the rounds and it is our understanding that when our recommendation hit the appropriate offices for implementation in the Pentagon and Baltimore, there was much confusion. Among the next things that happened was a meeting on 6 December in Baltimore, with Colonel Atwood. Davies and Heffern went there to discuss the RAND recommendation and its relationship with the GE proposal, our of which came the arrangements for the GE people to meet at RAND the following week. On 9 December, Davies and Heffern met with Colonel Stewart and discussed these things with him. On 10 December, Davies and Heffern put on a large briefing for WADC and another one for ATIC; names of attendees are attached. On 11 December, I had the Ritland Committee here at RAND, and took occasion to talk about the satellite program. More important, I got Atwood into see Frank during the noon hour, as a result of which we clarified RAND's position for Atwood very considerably, and agreed that Atwood's desire for us to have lengthy mutual conversations with the GE people was not feasible. Instead, their invitation to come here on the 13th of December was left standing, but was to turn into a one-sided bull session: they were going to talk to us and we were going to listen and later talk to Atwood. At the end of the Ritland Committee meeting here on 11 December, I got General Ritland in to talk to Frank about the same problems.

On 13 December a group of people from GE, Philadelphia, arrived here to talk to us. Their group was headed by Frank Rand and Bob Havilland. I found the day extremely uncomfortable: I did very little talking. In some semi-private conversation with their front man, Frank Rand, I asked for some explanation of the relationship of Raymond to this program; their claim was that he really didn't have anything to do with it. This is so obviously preposterous that we were unable to come to grips with this matter any more. They also claimed that the particular kind of stabilization system in their bird followed some previous consideration (and rejection) of our kind of spin stabilization. From where I sat this sounded and still sounds ridiculous. The kind of stabilization that GE is talking about is carefully treated in the RAND recommendation of February 1956, and is identical to what Raymond talked about on 29 October, and does not seem to have changed at all in the last couple of years.

On 19 December, Katz met with Atwood at Baltimore and attempted to give him the RAND consensus on the GE proposal. I was very careful to point out that we did not have an entirely unbiased viewpoint, and that we were not saying that the GE proposal was no good, that it wouldn't work, or anything of the like. Our pitch was straightforward: we thought GE deserved a good number of points for their effort, and that their proposal was very interesting, but it looked neither easy nor early. There seemed to be a good number of major development problems built in in their proposal and we still think so. (For example, essentially a completely new missile.)

In this meeting on the 19th of December, Atwood seemed reconciled to the notion described above and thought in fact that the way to go about this whole business was to have an outfit like Douglas, which is familiar with the Thor, take on the chore.

Way back around Wednesday, December 4, 1957, Bob Salter visited us at RAND. It appears that the 117L office had handed Lockheed our RM. Interestingly enough, Lockheed is the only one they handed it to. Baltimore gave it to GE, Oder gave it to Lockheed, and no one gave it to Douglas or anyone else. On 19 December, the Stewart DOD Committee again met at RAND with Clement and Buchheim at the main table and Davies in the audience. At this time, Lockheed discussed their version and their ideas about the RAND satellite. Their configuration involved use of their 117L satellite stage on top of the Thor instead of the Vanguard as the second stage which RAND recommended. On 30 and 31 December, Atwood came out to BMD for some further Air Force in-fighting, with results not officialy known to us.

To show you how up to date our information is, on 3 January we met with Lt. Colonel Sid Green, who is the 315 Project Officer at BMD. We exchanged a lot of information and found out that he is writing a development plan for a Thor astronautic capability, including a Thor-based ICBM. He has already asked for new facilities at Patrick, and is attempting to increase THOR production from six per month to eight per month, and recommends getting several Vanguard second stage items. The major decisions

are as yet unfunded and unmade. Green is taking the logical position that facilities and Thors will be needed for implementation of any new decisions and plans, and is taking first steps. He thinks facilities at Patrick could be made available by September 1958, whereas RAND thought the facilities would take 18 months. Green claims he is in a quandry about the liquid versus solid second stage argument. The Nike-Zeus solid rocket for second stage seems to have greater growth potential, and although it is behind the vanguard second stage in development at this time Green expects progress to be much more rapid with the solids. Such a second stage would have the advantage of being able to carry 1,000-pound warheads. Green's view seems to be that we should keep our minds open to solids and also to the possible use of the BTL guidance system.

Next week BMD is putting on a big briefing for General White, including these items among others.

Unofficially, we understand the following: It is believed that BMD will choose the contractor, as well as run the project. Our impression is that Lockheed is in first place with Douglas next. We understand there is a possibility of two contractors. There is still no money for this job. We understand also that Senator Johnson's group is going to be briefed in the near future and that this recce satellite pitch will be included as part of the Air Force briefing, and also that BMD will be briefing General Putt within a month on this project.

That brings the chronology up to date. Now let's go to the third item in your memo: I personally feel that it would be disastrous if Andrews briefed anybody, especially Tunner. He is a fine fellow but I don't think he understands doodly-squat about this reconnaissance satellite, apart from his not having any real enthusiasm which in principle would make up for his other deficiency.

Our best view of the relationship of 117L to our proposals is this: remove from 117L those functions which the RAND Pan satellite systems can perform. 117L should concentrate on those functions that require the talk-back link - such things as warning, spot surveillance, and the like. If RAND Pan-1 (the 12-inch version) works, we will get a much better feel for the potentialities of RAND Pan 2 and 3. If RAND Pan 3 is really feasible, it would likely perform at a detail level far superior to almost anything we can visualize for 117L at this time. In other words, it seems clear to us at this time that we are not about to fire off one of these monsters every few minutes, or any day that we want to get a question answered. It is out of this kind of thinking that we discover a role and utility for a long lived bird with a capability of doing specific reconnaissance on order. The warning problem is of course the kind of thing which the RAND satellites can not really contribute to in any meaningful way. I am sure there are other problems that our kind of satellite cannot really work on. It is - or should be - clear that the first order of business is to get one of these built and see how it works. We will be able to talk much more definitively at that time.

In closing, let me ask you, aren't you really glad you triggered this off?

Abram H. Katz
Electronics Department

AHK:mjb

[redacted]

Attachment to M-41

[redacted]

1-3-58

RAND Presentation - WADC - 10 December 1957

H. N. Wells, Jr. WCIF
R. D. Dunker
Eldon D. Sewell
Paul L. Pryor
A. W. Berg
D. L. Beam
F. D. Orazio
E. Barton Bell
J. Charnock
J. B. Armstrong, L/Col.
R. E. Fredette
C. C. Gays, 1/Lt.
J. A. Ellis
L. H. Corsaw
M. R. Malcomson, 1/Lt.
J. G. Law

R. E. Underwood
D. J. Graves
J. Conant
J. J. Glidewell
E. R. Jacoby
Frank Barta
U. K. Heidelauf
J. E. Esto
G. Zenskin
R. Doran
M. Nordlund
P. E. Hockman
S. M. Burka
J. Codaback
A. S. Mangel RAND
M. E. Davies RAND
C. Heffern RAND

RAND Presentation - ATIC - 10 December 1957

Col. Eriksen	Deputy Commander
Col. Pulling	Deputy for ELINT
Lt. Col. Pretiss	Assistant Deputy for Air Weapons Systems
Mr. Fensler	AFCIN-4F
Col. Shade	AFCIN-4A1, Chief Planning Division
Dr. Ovrebo	AFCIN-4A1, Technical Adviser Planning Division
Major Randall	AFCIN-4A1b, Plans Br